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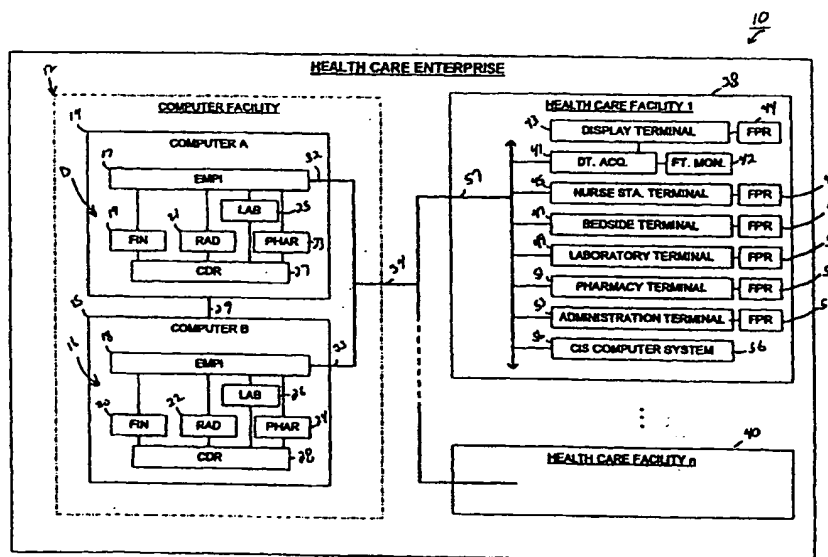
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(54) Title: ENTERPRISE HEALTHCARE MANAGEMENT SYSTEM AND METHOD OF USING SAME



(57) Abstract: A healthcare management system (10) includes a server system (12) connected to a plurality of enterprise facilities (38, 40) through a network (34). A master index (17, 18) and a shared document repository on the server (12) facilitate positively identifying patients and confidently associating patients with proper medical records. Healthcare practitioners also use the healthcare management system (10) to access a patient treatment plan system, irrespective of which enterprise facilities (38, 40) presently have the patient or which enterprise treatment plan operates the patient treatment plan.

1

ENTERPRISE HEALTHCARE MANAGEMENT SYSTEM  
AND METHOD OF USING SAME

## CROSS-REFERENCE TO RELATED APPLICATIONS

5        This application is a continuation-in-part patent  
application of U.S. patent application no. \_\_\_\_\_,  
filed June 30, 1999, and entitled "ENTERPRISE HEALTHCARE  
MANAGEMENT SYSTEM AND METHOD OF USING SAME," which is a  
continuation-in-part patent application of U.S. patent  
10 application no. 08/977,522, filed November 24, 1997, and  
entitled "CLINICAL CRITICAL CARE PATH SYSTEM AND METHOD OF  
USING SAME," which are incorporated herein by reference.

## STATEMENT REGARDING FEDERALLY SPONSORED

15                                RESEARCH OR DEVELOPMENT

Not Applicable

## REFERENCE TO A "MICROFICHE APPENDIX"

Not Applicable

## BACKGROUND OF THE INVENTION

Technical Field

The field of the present invention is healthcare management systems for healthcare enterprises. More specifically, the present invention relates to providing software applications for use by healthcare enterprises having a plurality of facilities.

Background Art

10       Modernly, primary healthcare is often times provided by healthcare enterprises. A healthcare enterprise is a group of healthcare facilities including, for example, hospitals, laboratories, pharmacies, and others. Healthcare enterprises can be expansive, encompassing 15 hundreds of doctors and many geographically widely dispersed point of care facilities. Alternatively, they can be more modest in size having just a few facilities.

          However, no matter what the size of the enterprise, all healthcare enterprises are coming under increased 20 pressure to improve patient care without incurring undue additional expense. Indeed, successful healthcare enterprises must become more efficient and effective in providing patient services to remain viable. Thus,

enterprises are striving to increase efficiency, while maintaining or improving patient care. For example, healthcare facilities are merging to form larger enterprises. In such a manner, the larger healthcare enterprises hope to improve efficiency through economy of scale.

Most healthcare enterprises have computer systems, and many have established local area networks within their facilities. The established computer systems typically perform a variety of particular and discrete functions. For example, a facility may have a clinical information system as described in U.S. patent application 08/977,522 for managing and presenting patient care management plans. The hospital may have other systems for financial and administrative functions. However, many of these established computer systems are unable to provide the information required to support healthcare enterprises in the modern managed care environment in an efficient and economical manner.

Further, each facility may have computer systems that operate differently and store information in diverse formats. Thus, information from different facilities of the same enterprise may not be readily usable by another

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effective process for associating a patient with a medical file in an accurate and efficient manner. If such a positive identification can not be made, then proper medical treatment may be delayed, or worse, an incorrect  
5 treatment may be provided to the patient.

A healthcare enterprise having multiple facilities may encounter several problems when admitting a patient. For example, it would be helpful to know whether or not the patient to be admitted is a current patient or had been  
10 previously admitted at any of the facilities of the same enterprise. Since each of the facilities may be using record management features incompatible with the other facilities, there is no efficient manner to find if a patient had been previously admitted to the same  
15 enterprise.

Confidently identifying the to-be-admitted patient can be a daunting task. However, it is critical that the patient be positively associated with their true and complete medical record, if available. Such an  
20 identification task is exacerbated if the patient is unconscious. In such a manner, the person admitting the patient must rely solely on anecdotal information to establish the identity of the patient. Thus, the actual

identity of the patient may not be established, or an incorrect identity made. Either way, providing treatment for the patient is difficult and may even result in harmful delays or treatment for the patient.

5       Once a patient has been successfully admitted to a multi-facility enterprise, then it is typical for several practitioners to become involved in providing healthcare to that patient. For example, doctors, nurses, laboratory technicians, radiologists, and pharmacists are needed to  
10   implement a successful treatment plan. However, these healthcare providers may be located in separate facilities, which may be widely dispersed geographically.

      In providing healthcare to a patient, it is highly desirable that a complete medical history be available to  
15   healthcare practitioners. However, in the modern healthcare environment, patients routinely are transferred to different facilities of the same enterprise. Thus, over a period of years a patient's medical record becomes fragmented and dispersed among the various facilities of an  
20   enterprise.

      Therefore, in general, it would be highly desirable to have a new computerized system for more efficiently and

effectively communicating patient information among the various facilities of a healthcare enterprise.

The new system further needs to be quickly and confidently installed without burdensome expense to the enterprise. It is also desirable that existing legacy applications, computers, and networks cooperate with the new system. In such a manner the enterprise preserves prior information technology investments.

#### SUMMARY OF THE INVENTION

10 It is therefore an object of the present invention to provide a new enterprise healthcare management system for providing improved communication between healthcare facilities.

In another separate object of the present invention  
15 the new healthcare management system should enable a remote practitioner to easily access or modify a patient's complete chart.

Briefly, the above and further objects are realized by providing a new enterprise healthcare management system and  
20 method of using same. The enterprise healthcare management system and method includes a novel healthcare management system. The healthcare management system includes a server system connected to a plurality of enterprise facilities.



A master index and a shared document repository on the server facilitate positively identifying patients and confidently associating that patient with proper medical records. The method of using the system also facilitates finding where in the enterprise a patient is located, and identifying available patient records. Healthcare practitioners also use the healthcare management system to access a patient treatment plan system, irrespective of which enterprise facility presently has the patient or which enterprise treatment plan system operates the patient treatment plan.

Advantageously, the new healthcare management system facilitates a healthcare enterprise's positively identifying patients and associating the identified patient with that patient's records. In such manner a patient can be admitted to an enterprise facility more efficiently. Further, as a patient moves to different locations and facilities within the enterprise, practitioners can confidently identify the patient prior to administering treatment. Therefore, the quality of delivered healthcare is improved.

The healthcare management system also enables a practitioner to quickly find where a patient is located in

the enterprise, and determine what records exist and where the records can be found. By enabling such easy access to complete information, the healthcare management system allows the healthcare enterprise to operate more  
5 efficiently.

Further, the healthcare management system enables a practitioner at any enterprise facility to seamlessly use the treatment plan system for any enterprise patient. Thus, remote practitioners can efficiently access patient  
10 treatment plans so that the practitioner can review, adjust, and implement patient treatment plans.

The new healthcare management system also easily adjusts to changes within the enterprise. As the enterprise grows, adds facilities, sells facilities, and  
15 changes, the new system easily and cost effectively scales to facilitate the new level of need.

#### BRIEF DESCRIPTION OF DRAWINGS

The above mentioned and other objects and features of  
20 this invention and the manner of attaining them will become apparent, and the invention itself will be best understood by reference to the following description of the embodiment

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of the invention in conjunction with the accompanying drawings, wherein:

FIG. 1 is a block diagram showing a healthcare enterprise made in accordance with the present invention;  
5 and having multiple facilities;

FIG. 2 is a block diagram of a multiple enterprise healthcare system made in accordance with the present invention showing the interconnection of a plurality of healthcare enterprises;

10 FIG. 3 is a flowchart of a method enterprise in accordance with the present invention for admitting a patient to a healthcare;

FIG. 4 is a continuation flowchart of FIG. 3;

FIG. 5 is a flowchart of a method in accordance with  
15 the present invention for finding a patient at a healthcare enterprise;

FIG. 6 is a flowchart of a method in accordance with the present invention for accessing a CIS system for a patient;

20 FIG. 7 is a flowchart of a method in accordance with the present invention for admitting a patient into a healthcare facility;

FIG. 8 is a continuation flowchart of FIG. 7; and

FIG. 9 is a flowchart of a method in accordance to the present invention for installing a healthcare facility management system.

5                   BEST MODE FOR CARRYING OUT THE INVENTION

Referring now to the drawings, and more particularly to FIG. 1 thereof, there is shown a new healthcare management system 10 which is constructed in accordance with the present invention. The healthcare management system 10 is for use in healthcare enterprises comprising two or more facilities. These facilities, for example, may provide a point of care for healthcare patients.

The healthcare management system 10 generally comprises a redundant server system 12 which is connected via a network 34 to the healthcare facilities 38 and 40. Thereby, healthcare practitioners in the healthcare facility, such as healthcare facility 38, access the server system 12 from terminals. Each healthcare facility may be operating its own clinical information system (CIS) computer system 56. The CIS system provides, for example, the implementation of treatment plans for patients, as more fully addressed in the patient applications. Although each facility has a separate CIS system, the server system 12

12

has an enterprise master patient index (EMPI) 17 and 18 for storing patient identifiers from all healthcare facilities.

In such a manner, a health practitioner at any healthcare facility can find and retrieve information on any  
5 enterprise patient irrespective of which facility the patient is currently located.

In operation the server system 12 operates a suite of healthcare software applications 13 and 16 for providing software applications for the facilities of the healthcare  
10 enterprise. Associated with the suite of applications 13 and 16 is a common document repository (CDR) 27 and 28 for providing commonly accessible storage areas for all healthcare facilities. Further, the EMPI 17 and 18 store patient identifiers which are accessible at all enterprise  
15 facilities.

Additionally, the EMPI 17 and 18 may contain authorization information related to healthcare practitioners. For example, a nurse practitioner may approach nursing station terminal 45 and desire to view a  
20 particular patient's medical record. The nurse enters basic authorization information into the nurse's station terminal 45 which is received at the server system 12 and compare to authorization information within the EMPI.

13

Provided the nurse initially appears to be a valid user, the nurse will be prompted to place his/her finger onto fingerprint reader 46. The fingerprint reader 46 scans the nurse's finger to record a fingerprint pattern.

- 5 Information indicative of the fingerprint pattern is also sent to the server system 12 where it is compared to fingerprint pattern information stored in the EMPI. If the nurse is a valid user of the system, and has authorization proper for the requested action, the server system 12
- 10 allows the nurse to proceed with the desired action.

- The nurse at nurse's station 45 may then enter patient specific information into the nurse's station terminal 45. The patient specific information is received at the server system 12 where the patient specific information is
- 15 compared to the patient identifiers within the EMPI 17 and 18. If inconclusive patient specific information has been entered, the EMPI may identify several patients substantially matching the received patient's specific information. Thereby, the server system 12 retrieves
- 20 further patient information for each identified possible match and forwards the more complete patient information back to the nurse's station terminal 45. The nurse then reviews the received more complete medical records and

14

selects with confidence the medical record for the patient at issue. In such a manner the nurse positively identifies a patient and associates the patient to their true medical record file.

- 5        With the healthcare management system 10 generally described, component parts will now be discussed in more detail. The server system 12 is a redundant computer system having computer A 14 and computer B 15. Computer A 14 is connected to computer B 15 via redundant link 29.
- 10    In such a manner, both computer A and computer B operate simultaneously to assure that each is running properly. If one of the computers fails, then the failing computer is shut down and the remaining redundant computer continues on, thereby providing service in an uninterrupted manner.
- 15    The installation and use of redundant computer systems is well known in the art.

Both computer A 14 and computer B 15 operate a suite of healthcare applications 13 and 16. The suite may include financial software 19 and 20, radiology software 21 and 22, laboratory software 25 and 26, and pharmacy software 23 and 24. Although four applications are identified, those skilled in the art will recognize other applications may be substituted or supplemented. Each of

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computer 14 and 15 has a CDR data base 27 and 28 for storing information in a manner such that the information can be shared between suite applications. In such a manner, multi-disciplinary information may be retrieved  
5 from the CDR 27 and 28. Further, the CDR 27 and 28 contains information received from applications operating at the healthcare facilities 38 and 40. For example, healthcare facility 1 38 has a computer system operating a CIS system 56. Patient care information from CIS computer  
10 system 56 is sent to server system 12 where it is stored on the CDR 27 and 28. In such a manner, healthcare practitioners at any healthcare facility 38 and 40 can retrieve and review documents stored on the CDR relating to the CIS computer system 56.

15 Both computer A 14 and computer B 15 have an EMPI file. The EMPI file is the master index for accessing the server system 12 and finding patients and patient information. The patient identifier information include identifying characteristics for identifying patients with a  
20 high degree of certainty. Such patient identifiers may include name, birth date, social security number, birth date, gender, fingerprint pattern data, or race. Those skilled in the art will recognize other identifiers may be



16

used. The EMPI thereby stores patient identifiers for all patients of the healthcare enterprise. Thus, irrespective of which facility admits a patient, patient information is stored in a common and accessible format. Subsequently, information related to that patient can then be found and retrieved by any healthcare practitioner from any healthcare facility within the enterprise. Indeed, one of the healthcare identifiers even tracks the present location for an admitted patient.

Computer A 17 accesses the network 34 at access point 32 and computer B 15 accesses the network 34 at access point 33. As shown, access to the server system is controlled by the EMPI. In such a manner, EMPI identifies those healthcare practitioners authorized to access features of the server system 12 and the practitioner's authorization level. For example, some healthcare practitioners may not be able to access the server system 12 at all, while others may have an ability to review patient medical records, but not financial records, and others may have full rights to all data. Thus, the EMPI tracks who can validly access the system at what authorization level.

To further increase security on the system, the EMPI may also store fingerprint information for each authorized user. In such a manner, during initialization of the system each authorized user has their fingerprints scanned and stored in the EMPI. Then at a later time when the practitioner desires to access the system, the practitioner uses a remote fingerprint reader such as remote fingerprint reader 46 to scan their fingerprint. The scanned fingerprint is compared with the stored fingerprint information in the server system 12. In such a manner, the server system 12 can verify with a high degree of confidence that the practitioner can be trusted.

Each healthcare enterprise generally has more than one facility. For example, the healthcare enterprise of figure 1 has n healthcare facilities 40. Each of the healthcare facilities will be similar to healthcare facility 1, although some facilities may have more, less, or a different mix of functions as compared to healthcare facility 1 38.

Healthcare facility 1 38 is a hospital for providing a point of care for patients. In such a manner the healthcare facility 38 has specialized equipment such as data acquisition device 41 and fetal monitor 42 for

monitoring newborn babies. Associated with the data acquisition device 41 may be a display terminal 43 whereby a healthcare practitioner monitors the data acquisition unit 41 and gains access to the entire computer system, including the server system 12. Specifically, the practitioner at display terminal 43 may need to access the CIS computer system 56 to review or update a treatment plan for the infant on the fetal monitor 42.

However, the CIS computer system for the newborn may be operating at a different facility. For example, the newborn baby on fetal monitor 43 may have been originally admitted to an emergency facility where the emergency facility's CIS was used to establish a treatment plan. As the newborn progressed, he/she may have been moved to facility 1 38, which is remote from the emergency facility. Thus, when the practitioner needs to access, review, and update the CIS treatment plan for the newborn, the practitioner does not access CIS computer system 56, but must access the CIS computer system for the emergency facility. Such access, as will be further discussed, is provided by display terminal 43.

Attached to display terminal 43 is a fingerprint reader 44 for verifying the practitioner and assuring the

practitioner has the necessary authorization to perform the desired function. The fingerprint reader can also be used to assist in positively identifying patients through fingerprint matching. Healthcare facility 38 also has a plurality of nurse's stations with terminals such as nurse's station terminal 45. Each nurse's station terminal has a fingerprint reader 46, again for providing verifications. Bedside terminals 47 may be positioned adjacent patients so that clinical records can be reviewed and updated adjacent patient location. Bedside terminal 47 has fingerprint reader 48 connected thereto for patient identification and practitioner authorization.

Major healthcare facilities also have a laboratory and a pharmacy associated therewith. Therefore, the laboratory will have a laboratory 49 with fingerprint reader 50 and the pharmacy will have a pharmacy terminal 51 with a fingerprint reader 52. In such a manner, laboratory personnel and pharmacy personnel have full access to the CIS computer system 56 and the server system 12.

Healthcare facilities also have administration functions for financial, insurance, and admitting purposes. For example, administration terminal 53 has fingerprint reading

54 connected thereto and may be used for admitting patients.

The various terminals and computers within healthcare facility 38 may be interconnected by a network 57. Indeed, network 57 can even be a complete Internet system. The network 57 connects to the server system 12 via network 34.

Other healthcare facilities such as healthcare facility n 40 are part of the healthcare enterprise. Several of these healthcare facilities may have their own CIS computer system operating. These CIS computer systems may be installed and running locally at the healthcare facility such as shown in healthcare facility 38, or the CIS system may be operating remotely on the server system 12 (not shown).

Referring now to FIG. 3 there is shown a method of admitting a patient 120 using the healthcare management system 10 of FIG. 1. As shown in block 121, a patient arrives at one of the healthcare facilities for the healthcare enterprise. A practitioner makes contact in block 122. This contact typically will be by a practitioner entering admitting information into an administrative terminal such as administrative terminal 53 or by an emergency room personnel admitting information

into an emergency room terminal (not shown). The practitioner enters authorization information, such as the practitioner's user name and password into a terminal such as administration terminal 53 as shown in block 124. Other  
5 information may be required, such as a challenge security system for further verifying the practitioner.

During the verification process, the practitioner is directed to place his/her finger on a fingerprint reader and the fingerprint reader scans the practitioner's  
10 fingerprint as shown in block 126. The use of a fingerprint reader adds significant additional security to the system, but is optionally used. Further, those skilled in the art will recognize other types of security devices may be added. For example, speech patterns and retina  
15 scans can also be used for verifying and identifying people.

Referring again to FIG. 3, block 128 shows that the information indicative of the scanned practitioner's fingerprint is compared to the practitioner fingerprint  
20 information stored in the EMPI file. In block 130, if the practitioner fails the authorization routine, then the practitioner must reenter or correct the information. Those skilled in the art will recognize that often a user

- is given a set number of attempts, such as three attempts, before the system generates an intrusion alert. The practitioner also must be authorized to perform the particular function requested. Here, the practitioner
- 5 desires to admit a patient. Each practitioner has an authorization level associated therewith which determines what functions they may properly perform in the system. If the practitioner is valid and authorized, then the patient may be properly admitted by that practitioner.
- 10 The practitioner then determines if the patient is conscious in block 133. If not conscious, the practitioner collects any available information from other parties such as family members, emergency personnel, or documents retrieved from the patient's body as shown in block 135.
- 15 If the patient is conscious, then the practitioner can interrogate the patient for basic patient information as shown in block 137. For example, the practitioner will collect patient name, age, birth date, social security, and other data that can positively identify the patient. Block
- 20 139 shows that optionally the fingerprint reader can be used to collect a fingerprint scan from the patient. This can be the same fingerprint reader used by the practitioner for verification and authorization. In such a manner, the

scanned patient fingerprint is compared to stored fingerprint information in the EMPI as shown in block 142. Such a fingerprint scan comparison facilities correctly identifying a patient.

5       The data collected by the practitioner, and the fingerprint scan information, if collected, may not positively identify the patient. Therefore, there may be multiple patients which sufficiently match the collected data that the system cannot automatically make a positive  
10   determination based on the collected patient information. Therefore, block 144 shows that the system collects and displays stored patient information for all patients matching the collected patient data. These tentative patients have identifiers sufficiently close to the  
15   collected patient data that the practitioner will need to review the additional patient information to determine which patient is actually waiting to be admitted as shown in block 146. This additional patient information can include demographic information such as address, and  
20   medical record data. Those skilled in the art recognize other information can be included as additional patient information.



Even though the additional patient information has possibly been collected at multiple enterprise facilities by different CIS computer systems, since each facility's CIS system forwards information to the CDR, the CDR has

5 substantial patient information for the whole enterprise. In such a manner the additional patient information for all tentative patients is quickly and efficiently sent to the practitioner.

After reviewing the additional patient information, if

10. the patient cannot be positively identified, then the practitioner adds the patient to the EMPI as a new patient as indicated in block 151. In such a manner, collected basic patient specific information and the fingerprint scan will be stored in the EMPI for future use. The

15 practitioner then can proceed to establish a CIS treatment plan for the newly added patient as shown in block 155. However, if the practitioner is able to make a positive ID of the patient, then the practitioner selects the

20 positively identified patient from the list of tentative patients as shown in block 153. The practitioner then can proceed to review and use the CIS system to establish the current treatment plan as shown in block 155. Finally, the

EMPI file is updated to reflect that the patient has been admitted and is located at the current facility location.

Referring now to FIG. 5, there is shown a method for finding a patient using the healthcare management system of FIG. 1. FIG. 5 shows in block 161 that a practitioner at a healthcare facility needs to find a patient. The practitioner may believe the person is a currently admitted patient, or may want to get an updated status on an old patient. The practitioner can be located in the same or a different facility from where the patient is located. Indeed, the practitioner may not even know in what facility the patient is presently located.

As described in detail above, the practitioner is verified and authorized as shown in block 163. In block 165, the practitioner enters patient specific data relating to the patient at issue. As described more fully above, the system compares the patient specific data to patient identifier data in the EMPI in block 167 and then collects and displays tentative patients in block 167. The practitioner then can review the tentative patient list in block 170 and select, if displayed, the positively identified patient as shown in blocks 172 and 176. If no such patient can be positively identified, the practitioner

is instructed to enter additional patient data as shown in block 174. However, since the practitioner is attempting to find information on a patient they believe to be admitted or an old patient, the practitioner is likely to  
5 have very specific patient identification information such as a patient medical number. In such a manner, the patient identification steps can be abbreviated as the practitioner already has positive ID information on the patient at issue.

10 The practitioner selects the positively identified patient at issue in block 176. Block 178 shows that the system then displays the identified patient information. Patient information can be included such information as the location information for the patient at issue. Further,  
15 the system can show any available patient records and where those records are located. Thereby, the practitioner can quickly locate not only the patient at issue, but all related medical and CIS records for that patient.

At other times the practitioner may desire to access  
20 the patient's CIS system to review and update the patient's treatment plan. As briefly discussed earlier, the patient's treatment plan may be on a CIS system at a different facility than where the patient is presently

located. Further, the CIS system may be different from the CIS system where the practitioner resides. For example, an enterprise may have several facilities, with each facility operating an associated CIS system. Since the patient may  
5 be at a facility remote from the practitioner, the practitioner's local CIS system has no visibility to the patient's CIS files.

Referring now to FIG. 6 there is shown a method 180 for a practitioner to access the CIS system for any patient  
10 in the enterprise. Block 181 shows that the practitioner knows a patient is within the enterprise system and that the practitioner wants to review and adjust the treatment plan for that patient. For example, a remotely located specialist may want to review a patient's medical file and  
15 make adjustments to the treatment plan. After validating and authorizing as shown in block 183 and discussed fully above, the practitioner enters minimal patient specific data into a terminal as shown in block 185. For example, the practitioner may simply enter the name of the patient  
20 or the patient medical ID number. The patient identification process is simplified as the practitioner is confident the patient is presently under care and is already somewhat familiar with the specifics of the

patient's case. Thus, the risk of mis-identification is minimized.

The system then queries, in parallel, all CIS systems in the enterprise for patient(s) matching the entered  
5 patient specific data as shown in block 187. If no matching patients are found, then block 192 asks the practitioner for additional information. If a positive ID is found in block 189, then the method accesses the CIS system having the patient's treatment plan as shown in block 194. In  
10 such a manner, the practitioner accesses a patient's CIS system by simply entering simple ID data irrespective of what facility is operating the CIS system for that patient.

Referring now to FIG. 2 there is shown another healthcare management system made in accordance with the  
15 present invention. This multiple enterprise healthcare system 60 not only provides healthcare management tools for the individual enterprise, but enables a sharing of selected information between healthcare enterprises. In such a manner, healthcare may be delivered to a patient in  
20 an expedient and efficient manner irrespective of which healthcare facility or healthcare enterprise the patient selects.

The multiple enterprise healthcare system 10 comprises multiple healthcare enterprises such as healthcare enterprises 62, 64, 66 and 68. For example, healthcare enterprise 62 is similar to the healthcare enterprise described in FIG. 1. In such a manner, healthcare enterprise 62 comprises multiple facilities such as facility 1, 69, facility 2, 73, an administration facility 75, a pharmacy facility 77 and other unspecified facilities up to facility x, 78. Healthcare enterprise 62 has financial application solutions 82 operating at its administration facility 75 and pharmacy support software 85 active at its pharmacy facility 77. In such a manner, healthcare enterprise 62 is self sufficient for financial and pharmacy software and therefore will not need to utilize the financial and pharmacy services available from the central server 98. However, information from the financial 82 and pharmacy 85 software will be sent to the CDR 104 and 105 of the server system 98 to facilitate multi-disciplinary decision support.

Healthcare enterprise 64 is, similar to healthcare enterprise 62 and has facility 1 70, facility 2 74 and administration facility 76 operating financial software 83 and other facilities up to facility y 79. However,

healthcare facility 64 does not have any pharmacy facility.

Healthcare enterprise 66 is also similar to healthcare enterprises 62 and 64 except that this enterprise operates on a slightly smaller scale. In such a manner, healthcare  
5 enterprise 66 has a facility 1 72, a laboratory facility operating lab software 87, and up to a facility z 80. Finally, healthcare enterprise D has only a single facility 72.

Each healthcare enterprise can supplement local  
10 healthcare applications by using remotely hosted applications on the server. For example, healthcare facility 1 is not locally operating any laboratory control application. Therefore, healthcare facility 1 may operate remotely the laboratory software operating on the server  
15 system 98. In such a manner enterprises may supplement existing capability by simply remotely hosting applications from the server system 98.

None of the healthcare enterprises 62, 64, 66, or 68 are presently running a local facility CIS system. Each of  
20 the healthcare enterprises connects to a network 90 via a network connection such as network connection 91, 93, 94 or 95. The network 90 may be any one of several available public or private networks, such as the Internet. For

public networks, additional security becomes necessary.

The network 90 connects to the computer server 98 via link 92.

Computer server 98 is similar to server system 12  
5 discussed above and comprises network computers 96 and 98.

Server system 98 operates the same suite of healthcare applications as operating on server system 12, except server system 98 has an additional VHCIS/CIS application 100 and 101. This application is for providing CIS  
10 functionality for each healthcare facility not having a local facility CIS system. As with server system 12, the EMPI 102 and 103 provide practitioner authorization and patient finding functions.

When installing the multiple enterprise healthcare  
15 system, each healthcare enterprise must select how that enterprise will implement CIS systems. For example, the healthcare enterprise can choose to operate CIS on a facility by facility basis. For example, if healthcare enterprise 62 selects to operate CIS on a facility-by-  
20 facility basis, facility 1 will have a CIS system which operates separately from the CIS facility for facility 2. To make such a selection, the healthcare enterprise 62 chooses to install CIS in blocks 100 and 101.



In making such a selection, the server system 98 establishes a physically or logically partitioned data base for each facility of the healthcare enterprise. In such a manner, the CIS for each facility operates independent of every other facility. Of course, using the inventive aspects already discussed, practitioners at facility 1 69, for example, can find patient information and access the CIS system for facility 2 73.

However, an enterprise may choose to operate its CIS system on a enterprise wide basis. In such a manner, all facilities in the enterprise operate on the same CIS system. To make such an election, the healthcare enterprise desiring to operate CIS on an enterprise wide basis selects to install VHCIS (virtual hospital clinical information system) in block 100 and 101. If the VHCIS is installed, then the server system 98 establishes a data base for holding all CIS information for all facilities.

Referring now to FIG. 7 there is shown a method of admitting a patient into the multiple enterprise healthcare system as shown in FIG. 2. The method of admitting 200 is similar to method of admitting 120 except the method operates on a network connecting multiple enterprises. In method 200 a patient arrives at a healthcare facility for

any enterprise as shown in block 201. The practitioner performs an authorization routine in blocks 203, 205, 207, 209, and 212 similar to the authorization routines discussed in FIG. 3.

5        Provided the practitioner is valid and authorized as shown in block 212, then the practitioner proceeds to collect information from the patient in blocks 214, 216, 218 and 220 in a manner similar to that shown in FIG. 3. The collected patient data is compared to the patient  
10    identifiers stored in the EMPI in block 223. The EMPI file contains not only patient identifiers for the practitioner's enterprise, but includes patient identifiers from the other networked healthcare enterprises. In such a manner, block 225 shows that tentative patient are selected  
15    from all enterprises and displayed for the review of the practitioner in block 227. Thereby, the practitioner not only has visibility to patients of the practitioner's enterprise, but searches other network enterprises for other possible matches. Of course, those skilled in the  
20    art will recognize that healthcare information can only be shared between healthcare enterprises pursuant to proper legal authorization for the transfer. Thus, medical data

is only transferred when necessary approvals have been received.

Referring now to FIG. 8, the practitioner selects the positively identified patient in blocks 228 and 233, if  
5 displayed. The practitioner adds the patient to the EMPI as a new patient in block 230 if not positively identified. Subsequently, the practitioner can establish CIS data for current treatment of the patient as shown in block 235. Finally, the EMPI file is updated to reflect that the  
10 patient is currently admitted into a particular facility location.

Referring now to FIG. 9, there is shown a method of installing the multiple enterprise health system as shown in FIG. 2. Block 241 shows that a plurality of healthcare  
15 facilities are connected to a wide area network. Such facilities may be interconnected by an intranet which is then connected to the wide area network, or each facility may have its own connection into the wide area network.

A remote host operates healthcare related applications  
20 and each facility is given access to these applications as shown in block 243.

The enterprise must decide if they choose to operate CIS on an enterprise wide basis as shown in block 245. If

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the enterprise chooses to install the enterprise wide VHCIS, then block 252 shows that the remotely hosted data base stores CIS data from multiple facilities. As shown on block 253, the VHCIS operates on the remote host, providing  
5 CIS services for all facilities.

If the enterprise chooses not to operate enterprise wide CIS, then the enterprise must choose whether they will operate CIS remotely from a computer such as server system 98 or if they will operate CIS locally at each facility.  
10 In block 247, if the enterprise chooses to operate CIS remotely, then the remotely host data base is partitioned so that each facility's data is stored in a separate partition of the data base as shown in block 254. For that facility, as indicated in block 255, CIS then operates on  
15 the remote host computer system.

However, if the enterprise chooses to locally operate CIS at a facility, then CIS system is installed locally at the facility, as shown in block 248. However, CIS data from the local CIS system is still sent. However, to a  
20 repository at the remote host as shown in block 249. Thereby, whether the CIS is operated remotely or locally, the server system 98 stores CIS information for the

enterprise. The enterprise may even choose to operate some facilities remotely and some facilities with local CIS.

Alternatively, an enterprise can elect to operate a subset of facilities using VHCIS, with other facilities  
5 operating either remote or local CIS systems. For example, an enterprise may operate all its general hospitals under a single VHCIS, but operate its specialty hospitals, such as a children's hospital, as a separate CIS. In such a manner the general hospitals would be active as VHCIS facilities,  
10 while the children's hospital would have a separate local or remote CIS system. Therefore, both CIS and VHCIS would be installed.

Although the preferred embodiment shows the CDR hosted on the server system, the CDR and/or the master index may  
15 also be distributed, such as on the local CIS systems.

While particular embodiments of the present invention have been disclosed, it is to be understood that various different modifications are possible and are contemplated within the true spirit and scope of the appended claims.  
20 There is no intention, therefore, of limitations to the exact abstract or disclosure herein presented.

## CLAIMS

What is claimed is:

1. A method for admitting a patient to a healthcare  
5 facility, the healthcare facility being one of plurality of  
healthcare facilities in a healthcare enterprise,  
comprising:  
generating a master index of patient identifiers,  
the patient identifiers for providing positive  
10 identification;  
loading, for patients from each of the plurality  
of healthcare facilities, patient identifiers into the  
master index so that the master index includes patient  
identifiers for patients from the plurality of healthcare  
15 facilities;  
verifying and authorizing a practitioner to admit  
the patient;  
collecting patient specific data from the  
patient;  
20 entering the patient specific data into the  
computer means;  
communicating the patient specific data to the  
server means;

38

comparing the patient specific data to the  
patient identifiers stored in the master index on the  
server means;

selecting one or more tentative patients whose  
5 patient identifiers correlate to the patient specific data;  
sending, for each selected tentative patient,  
patient information to the computer means;

reviewing, by the healthcare practitioner, the  
received patient information to positively identify the  
10 patient;

admitting the patient to the healthcare facility;  
updating the patient identifier for the patient  
to reflect the patient is now admitted to the healthcare  
enterprise; and

15 updating the patient identifier to reflect the  
healthcare facility where the patient is located.

2. The method of admitting a patient according to claim 1  
wherein the verifying and authorizing step further include:

20 using a security scan device attached to computer  
means at an admitting location;

scanning a physical attribute of the healthcare  
practitioner into the security device;

communicating information indicative of the scan  
to a server means;

comparing the scan information to authorization  
information stored in the server means; and

5            verifying the healthcare practitioner is  
authorized to admit the patient.

3.    The method of admitting a patient according to  
claim 1 further including scanning with a fingerprint  
10    reader the patient's fingerprint and comparing the scanned  
fingerprint to fingerprint information stored in the master  
index to facilitate positively identifying the patient.

4.    The method of admitting a patient according to  
15    claim 1 wherein the patient information is stored in the  
master index and includes demographic information and  
medical record number data.

5.    The method of admitting a patient according to  
20    claim 1 wherein the enterprise is networked to another  
healthcare enterprise, and the master index is loaded to  
include patient identifiers received from the other  
healthcare enterprise so that the selected tentative



patients include patients of the other healthcare enterprise.

6. A method for locating an admitted patient within  
5 a healthcare enterprise, the patient being admitted at one  
of a plurality of enterprise facilities, comprising:

generating a master index of patient identifiers,  
the patient identifiers for providing positive  
identification;

10 loading, for patients from each of the plurality  
of healthcare facilities, patient identifiers into the  
master index so that the master index includes patient  
identifiers for patients from the plurality of healthcare  
facilities;

15 verifying and authorizing a practitioner to  
locate the admitted patient;

entering patient specific data for the admitted  
patient into the computer means;

communicating the patient specific data to the  
20 server means;

comparing the patient specific data to the  
patient identifiers stored in the master index on the  
server means;

41

selecting one or more tentative patients whose  
patient identifiers correlate to the patient specific data;

sending, for each selected tentative patient,  
patient information to the computer means;

5           reviewing, by the healthcare practitioner, the  
received patient information to positively identify the  
patient;

selecting the positively identified admitted  
patient; and

10           viewing the patient information for the admitted  
patient to determine where the admitted patient is  
presently located.

7.   The method of finding a patient according to  
15   claim 6 wherein the patient information for the admitted  
patient further includes file location information.

8.   The method of finding a patient according to  
claim 6 wherein the verifying and authorizing step further  
20   include:

using a security scan device attached to computer  
means at an admitting location;

42

scanning a physical attribute of the healthcare practitioner into the security device;

communicating information indicative of the scan to a server means;

5           comparing the scan information to authorization information stored in the server means; and

          verifying the healthcare practitioner is authorized to admit the patient.

10           9. The method of finding a patient according to claim 6 wherein the patient information is stored in the master index and includes demographic information and medical record number data.

15           10. The method of finding a patient according to claim 6 wherein the enterprise is networked to another healthcare enterprise, and the master index is loaded to include patient identifiers received from the other healthcare enterprise so that the selected tentative  
20 patients include patients of the other healthcare enterprise.

11. A method of using a facility treatment plan system for a healthcare facility, the healthcare facility being one of a plurality of healthcare facilities in a healthcare enterprise, the plurality of healthcare facilities each operating a treatment plan system, comprising:
- validating and authorizing a practitioner at a remote enterprise facility to access the facility treatment plan system;
  - 10 providing terminal means at the remote facility; entering, by the practitioner, minimal patient specific data into the terminal means;
  - transmitting the minimal patient specific data to each operating treatment plan system to query all the enterprise treatment plan systems;
  - 15 identifying which treatment plan system is operating a treatment plan for a patient corresponding to the entered minimal patient specific data;
  - accessing, with the terminal, the identified treatment plan system; and
  - 20 using, by the practitioner, the treatment plan system to perform a healthcare action on the patient treatment plan.

12. The method of using a facility treatment plan system according to claim 11 wherein the verifying and authorizing step further include:

- 5           using a security scan device attached to the terminal;
- scanning a physical attribute of the healthcare practitioner into the security device;
- communicating information indicative of the scan
- 10 to a server means;
- comparing the scan information to authorization information stored in the server means; and
- verifying the healthcare practitioner is authorized to admit the patient.

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13. The method of using a facility treatment plan system according to claim 11 wherein the minimal patient specific data is the admitted patient's name.

- 20           14. A method of activating treatment plan means for a healthcare enterprise, the enterprise having a plurality of healthcare facilities, comprising:

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providing computer means for each of the plurality of healthcare facilities, the facilities being part of the healthcare enterprise;

networking the computer means to a server means,  
5 the server means operating a suite of health care applications;

generating a master index of patient identifiers, the patient identifiers for providing positive identification;

10 loading, for patients from the plurality of healthcare facilities, patient identifiers into the master index so that the master index includes patient identifiers for patients from the plurality of healthcare facilities;

establishing a repository for storing healthcare  
15 information from the plurality of healthcare facilities;

establishing an authorization index for validating and approving practitioner access to the application suite and the repository;

selecting which of the plurality of facilities  
20 are to operate a unified treatment plan system; and

installing, for the selected facilities, a VHCIS treatment plan system on the server means.

46

15. The method of activating treatment plan means according to claim 14 further including installing a CIS treatment plan system on the server means for a facility not selected to operate the unified treatment plan system.

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16. The method of activating treatment plan means according to claim 15 wherein the CIS treatment plan system further includes installing a partitioned database for storing CIS information.

10

17. The method of activating treatment plan means according to claim 16 wherein the database is logically partitioned.

15

18. The method of activating treatment plan means according to claim 16 wherein the database is logically partitioned.

19. The method of activating treatment plan means according to claim 14 further including installing a local CIS treatment plan system at a facility not selected to operate the unified treatment plan system.

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47

20. The method of activating treatment plan means according to claim 14 wherein the master index is on the server means.

5 21. The method of activating treatment plan means according to claim 14 wherein the repository is on the server means.

22. The method of activating treatment plan means  
10 according to claim 14 wherein the authorization index is incorporated into the master index.

23. The method of activating treatment plan means according to claim 14 wherein the master index is  
15 distributed on the network.

24. The method of activating treatment plan means according to claim 14 wherein the repository is distributed on the network.

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25. The method of activating treatment plan means according to claim 14 wherein the enterprise is networked to another healthcare enterprise, and the master index is



48

loaded to include patient identifiers received from the  
other healthcare enterprise.

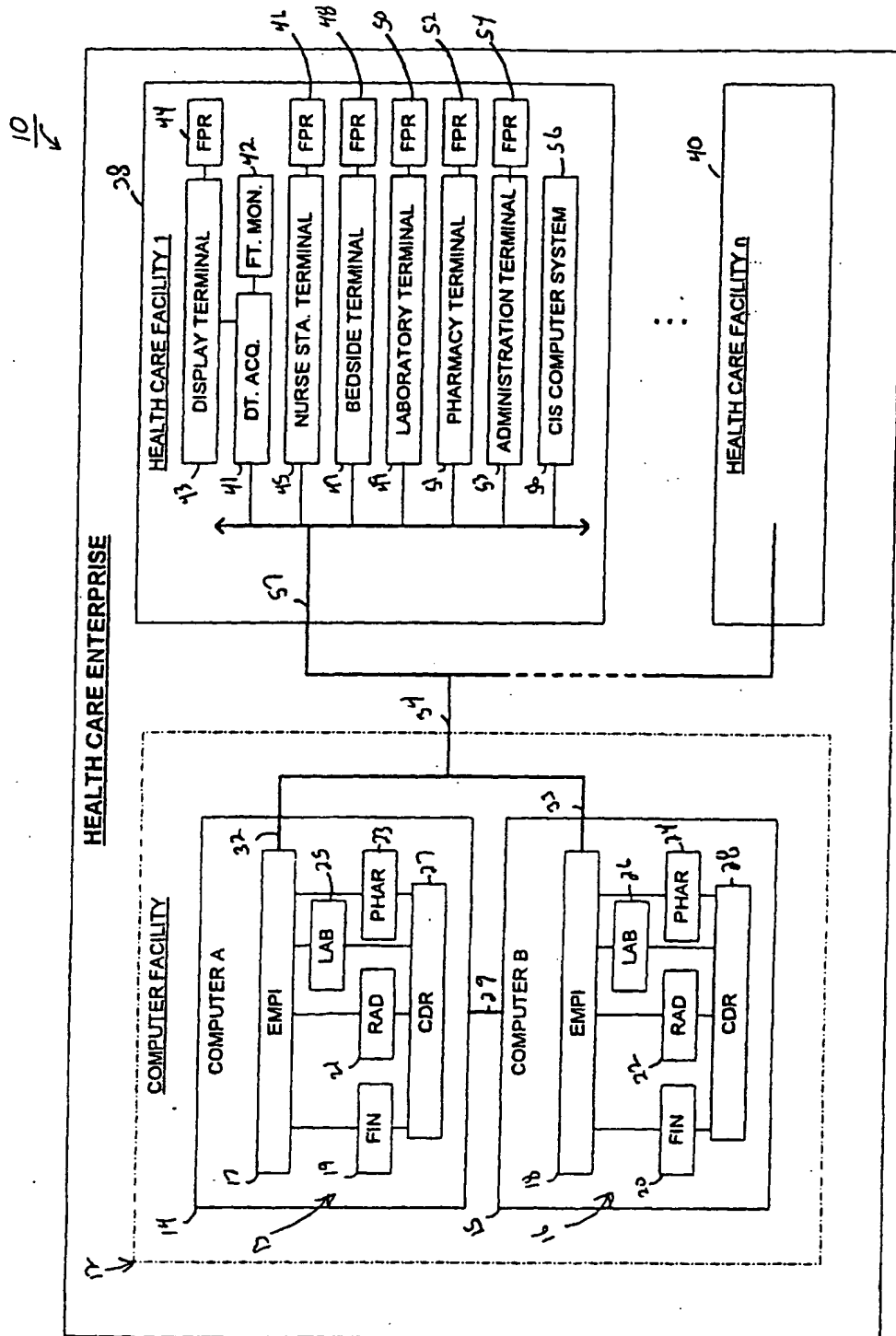


FIG. 1

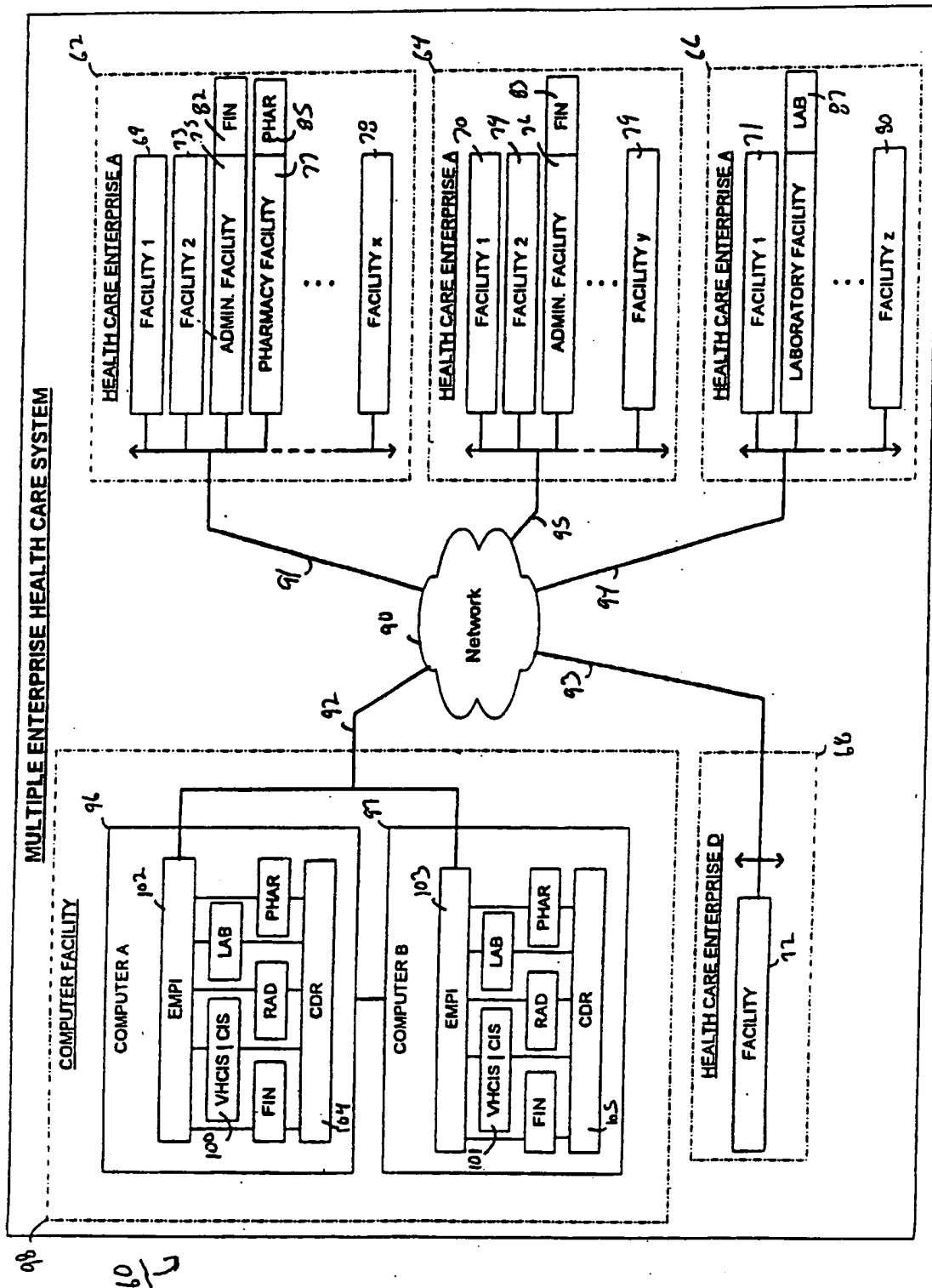


FIG. 2

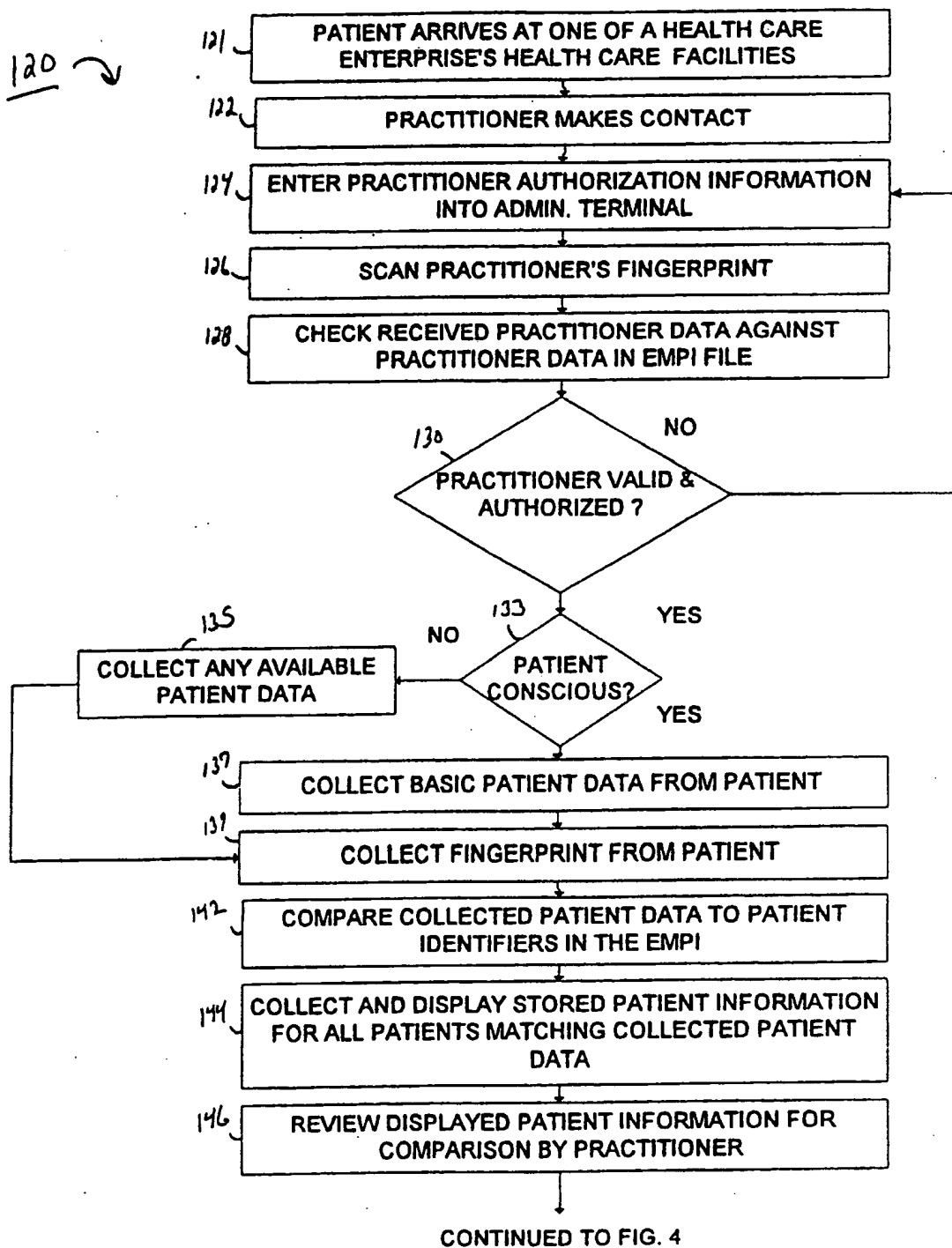


FIG. 3

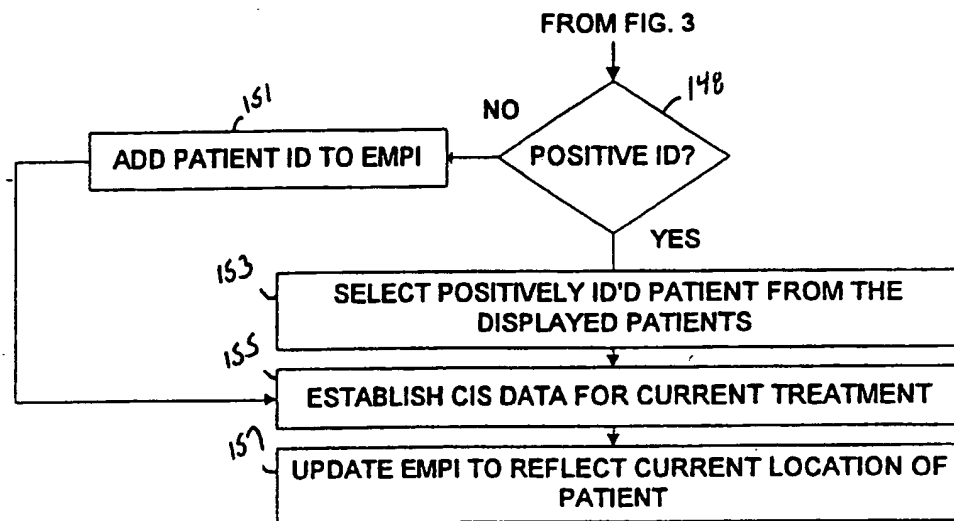


FIG. 4

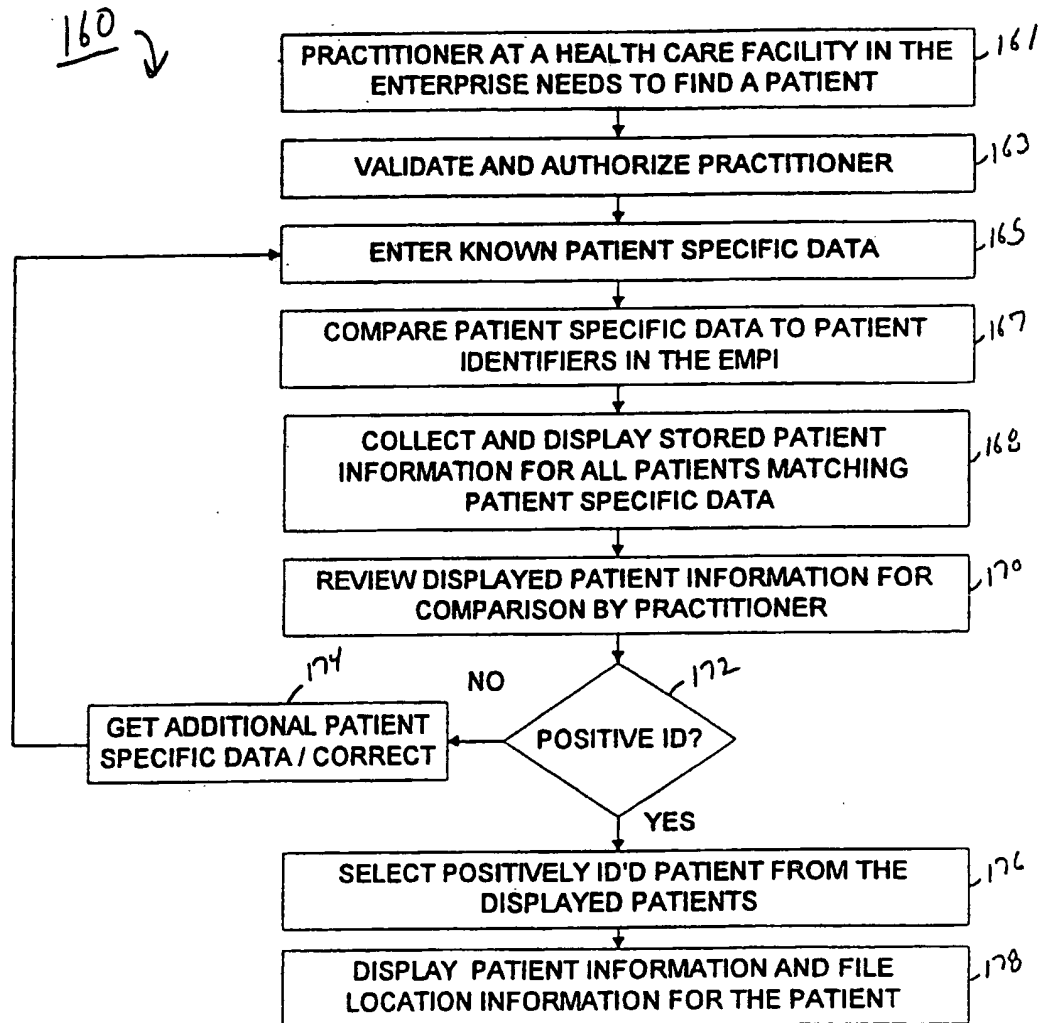


FIG. 5

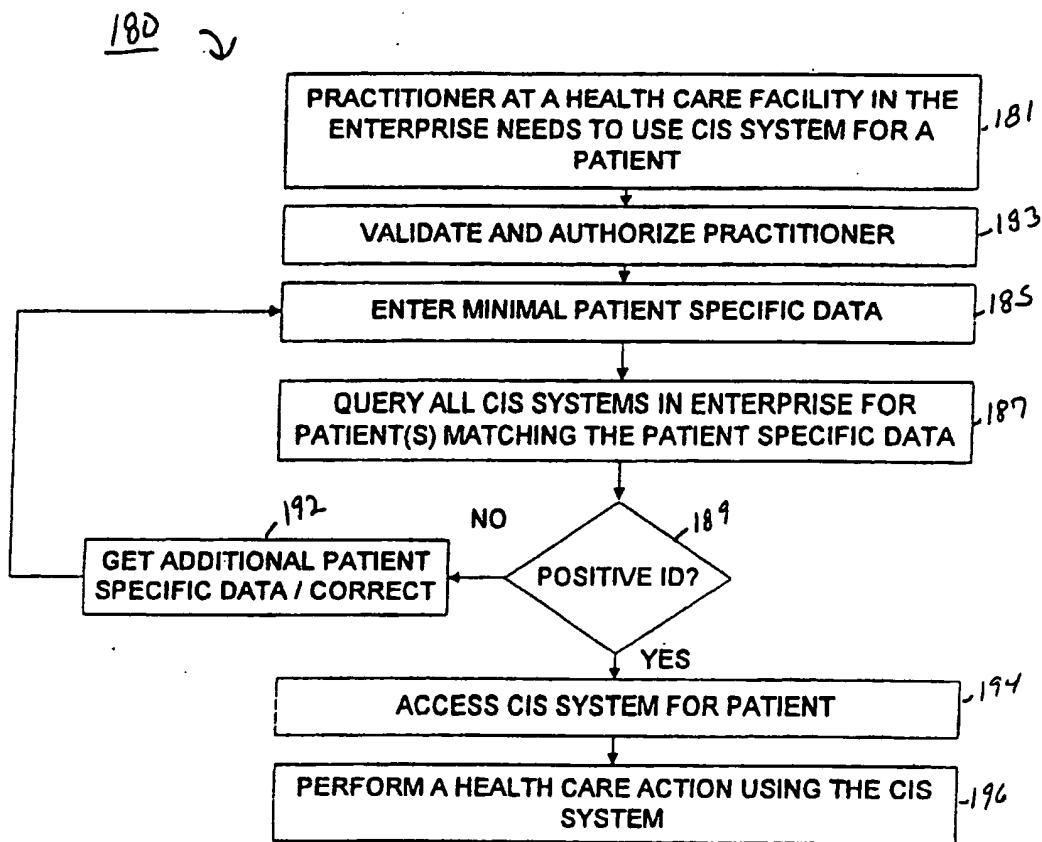


FIG. 6

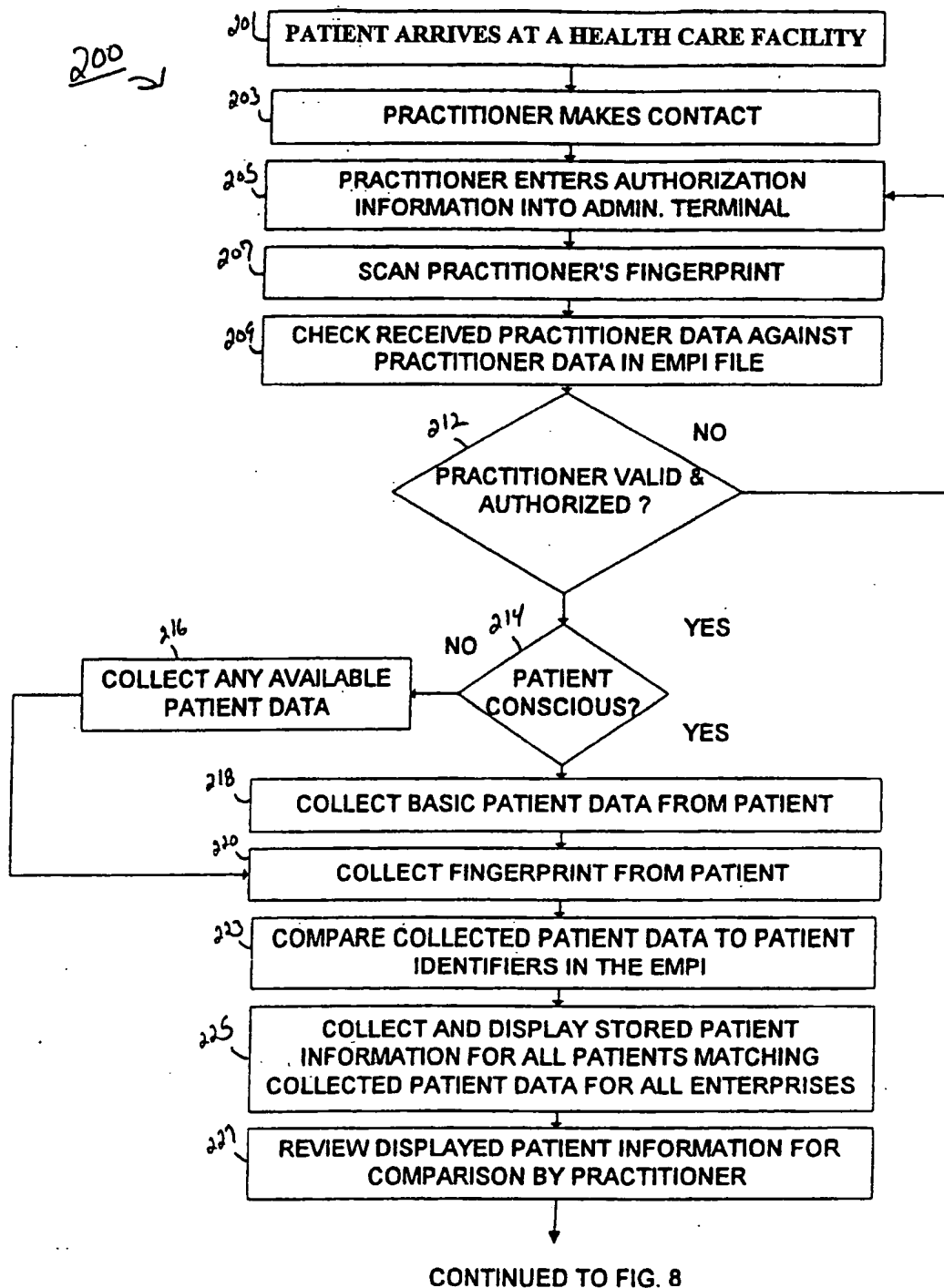


FIG. 7



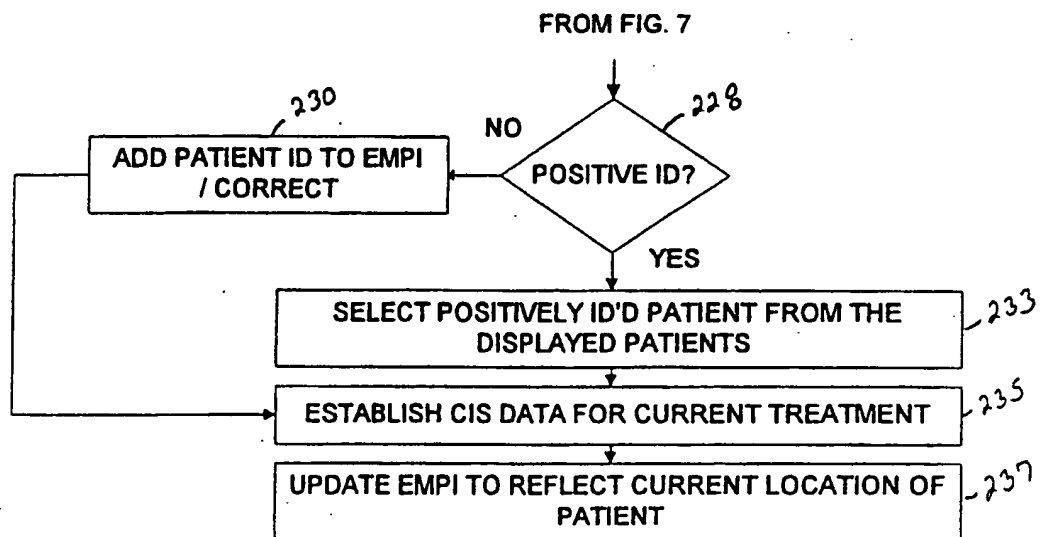


FIG. 8

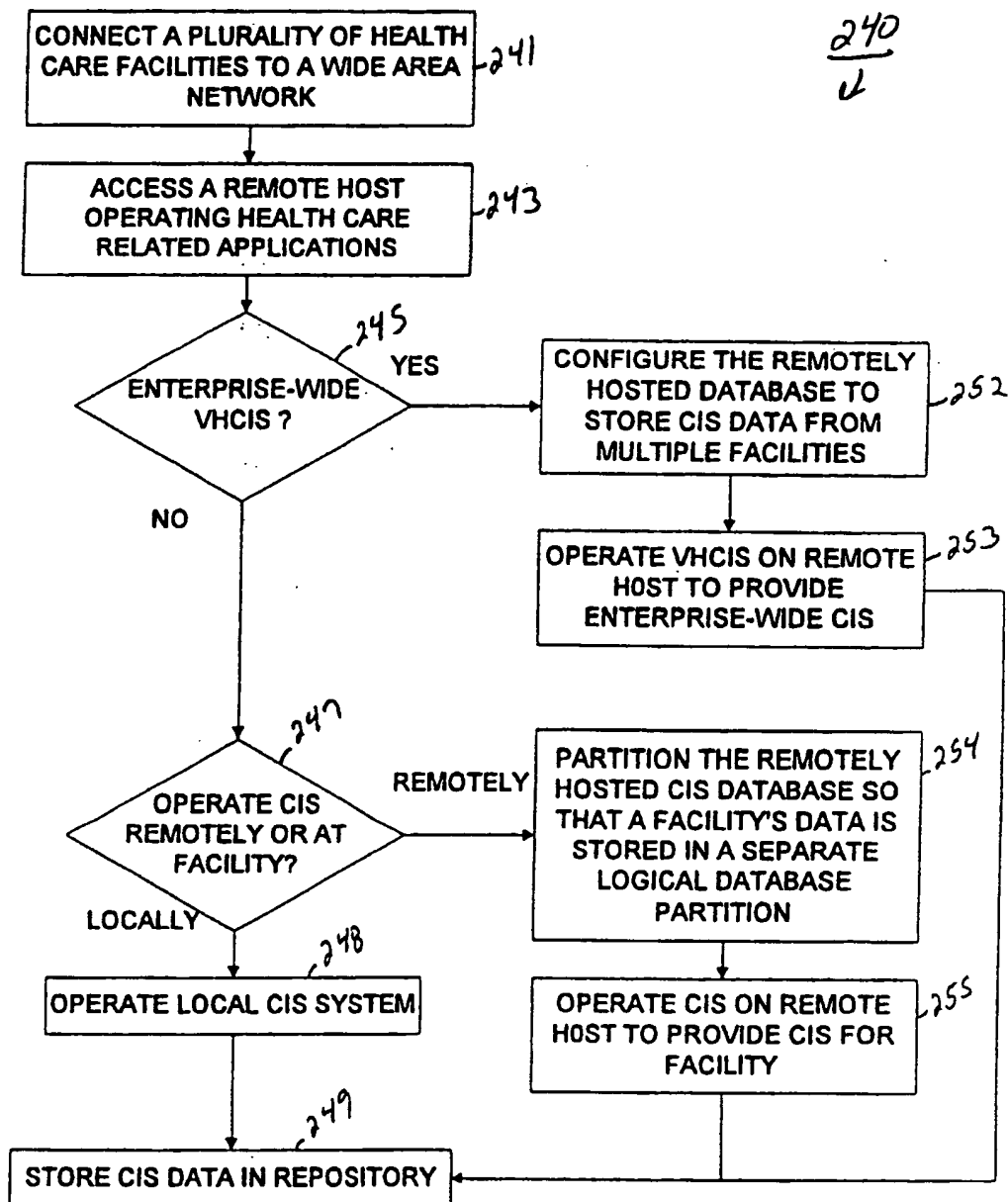


FIG. 9

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/16686

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 159:00

US CL :705/3

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/2, 3; 707/2, 3, 10, 100

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,193,855 A (SHAMOS) 16 MARCH 1993, COLUMN 2, LINES 9-37 AND COLUMN 5, LINES 7-47.	1-25
Y	US 5,262,943 A (THIBADO ET AL) 16 NOVEMBER 1993, COLUMN 7, LINE 5 TO COLUMN 12, LINE 40.	1, 6
Y	US 5,781,442 A (ENGLESON ET AL) 14 JULY 1998, COLUMN 12, LINE 7 TO COLUMN 15, LINE 32.	1-25
Y	US 5,845,253 A (RENSIMER ET AL) 01 DECEMBER 1998, COLUMN 3, LINE 10 TO COLUMN 7, LINE 38.	1, 6

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

07 AUGUST 2000

Date of mailing of the international search report

29 AUG 2000

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**INTERNATIONAL SEARCH REPORT****International application No.**  
PCT/US00/16686**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 6,005,962 A (HIROTA ET AL.) 21 DECEMBER 1999, COLUMN 3, LINE 44 TO COLUMN 5, LINE 40.	1-25